

WHAT IS CLAIMED IS:

1. An acrylic based multipolymer molding and extrusion composition possessing improved optical properties and low temperature impact resistance, comprising:
- 5 A) an acrylic based multipolymer, comprising in weight %: 8-12% acrylonitrile, 3-8% butyl acrylate, 3-5% ethyl acrylate, 3-8% methyl acrylate, 65-80% methyl methacrylate, and 15-30% styrene, said multipolymer present in an amount of from 55 to 85% by weight;
- B) a methylmethacrylate-butadiene-styrene (MBS) copolymer modifier
- 10 polymerized by a free radical process, said MBS copolymer modifier present in an amount of from 15 to 45% by weight;
- C) a UV stabilizer, selected from the group consisting of benzotriazole derivatives, triazine derivatives, and hindered amine light stabilizers, and combinations thereof, said UV stabilizer present in an amount of up to about 0.5% by weight; and
- 15 D) one or more additives including antioxidants, dyes and plasticizing flow enhancers, such additives present in an amount of up to 5.0% by weight;
- wherein said composition also possesses improved room temperature impact strength and optical clarity similar to that of unmodified acrylic resins.
- 20 2. The composition of Claim 1, wherein the MBS impact modifier is comprised of several monomers within the following composition range, in % by weight: 50-90% 1,3-butadiene, 5-45% methyl methacrylate, and 3-15% styrene.
3. A process for preparing an acrylic based multipolymer molding and extrusion
- 25 composition which comprises controlled feeding of auxiliary polymer additives that have different refractive indices from and are miscible with the multipolymer hard phase, to adjust the refractive index of the multipolymer hard phase to within 0.001 units and preferably 0.0005 units of the refractive index of the MBS modifier.

4. A process as in Claim 3, wherein the compounding of the MBS modifier into the multipolymer hard phase and the feeding of the auxiliary polymers occurs in a single extrusion step.
5. An acrylic based multipolymer molding and extrusion composition as in either of Claims 1 or 2, prepared with refractive index matching using auxiliary polymer additives, wherein the refractive index of the multipolymer hard phase is within about 0.001 units of the refractive index of the MBS modifier.
6. The composition of Claim 5, wherein the auxiliary polymer additives have composition within the following range, in % by weight:
- |                                  |                     |        |
|----------------------------------|---------------------|--------|
| Formula A, low refractive index: | methyl methacrylate | 92-98% |
|                                  | methyl acrylate     | 2-8%   |
| Formula B, high refractive index | methyl methacrylate | 30-50% |
|                                  | styrene             | 45-70% |
|                                  | acrylonitrile       | 8-12%  |
|                                  | ethyl acrylate      | 3-8%   |
7. The composition of Claim 5, containing up to 5% of lubricants, processing aids, and plasticisers.
8. The composition of Claim 5, containing up to 0.5% of UV stabilizers.
9. The composition of Claim 8, where the UV stabilizers are benzotriazole derivatives.
10. The composition of Claim 9, wherein said benzotriazole derivatives are selected from the group consisting of 2-(2'-hydroxy-5'-methylphenyl) benzotriazole, triazine derivatives, e.g. 2-(4,6-diphenyl-1,3,5-triazine-2-yl)-5-hexyloxy)phenol, hindered amine

light stabilizers, and combinations thereof.

11. The composition of Claim 5, where the room temperature impact strength is retained to a commercially significant level at sub-zero temperatures, as low as -80°F.

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12. An acrylic based multipolymer molding and extrusion composition possessing improved optical properties and low temperature impact resistance, comprising:

A) an acrylic based multipolymer, comprising a terpolymer of methyl methacrylate, styrene and ethyl acrylate in an amount of 64.25% by weight;

10 B) a methylmethacrylate-butadiene-styrene (MBS) copolymer modifier polymerized by a free radical process, said MBS copolymer modifier present in an amount of 35% by weight;

C) an antioxidant in an amount of up to about 0.4% by weight; and

D) a plasticizing agent in an amount of 0.4% by weight;

15 wherein said composition also possesses improved room temperature impact strength and optical clarity similar to that of unmodified acrylic resins.

13. The composition of either of Claims 1 or 12, wherein the composition contains a rubber phase, and the average particle size of said rubber phase is at least 50 nm.

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14. The composition of either of Claims 1 or 12, wherein the composition contains a rubber phase, and the average particle size of said rubber phase is on the order of about 100 nm.